

CLAIM AMENDMENTS

1. (Amended) A low-profile vernier x-y-theta substrate chuck for mounting to the vacuum-equipped movable platform of a high-resolution stage for multi-exposure projection lithography on a substrate of greater area than the area of the substrate chuck, characterized by:

a) an x-bracket which serves as a mounting frame and has multiple supporting means and locating surfaces for other elements;

b) x-bracket adjustment means mounted on said x-bracket;

10 c) an x- y-bracket, having a slideway, mounted operatively to said x-bracket;

d) a y, theta bracket, mounted slidably in said slideway of said x- y bracket, said y, theta bracket having a central yaw shaft opening and vacuum channel;

e) a yaw shaft fitted within said yaw shaft opening;

f) y-bracket adjustment means;

20 g) a configured yaw vacuum diffuser bracket (5) having a top plane surface forming ~~defining a substrate support~~ an apron, having a number of vacuum diffuser plate support islands (14) providing a multiple support plane for a vacuum diffuser plate (7); and having a peripheral vacuum diffuser plate locating relief (25) channel, with diffuser plate support islands (14) and peripheral ~~channel~~ vacuum diffuser plate locating relief (24) having a vertical position depth appropriate for supporting the bottom surface of ~~holding~~ a vacuum diffuser plate (7) with its top surface flush with the apron top surface of said yaw vacuum diffuser bracket (5) as said a substrate support plane;

h) a vacuum diffuser plate (7), mounted to said yaw vacuum diffuser bracket (5); and

i) adjustment means, for x, y and theta adjustment while mounted on the movable platform of such ~~said~~ high resolution stage.

2. (Amended) a low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said vacuum diffuser plate (7) is cemented to said vacuum diffuser plate locating support ~~islands~~ (14) and to said peripheral vacuum diffuser plate locating relief (25) ~~channel~~ with the ~~its~~ top surfaces of said vacuum diffuser plate (7) and the apron top surface of said yaw vacuum diffuser bracket (5) co-planar at said substrate support plane.

3. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said adjustment means is operable while said substrate chuck is mounted on a ~~said~~ high resolution stage.

20 4. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim ~~1~~ 3, wherein said adjustment means includes x, y and theta adjustability operable while said substrate chuck is mounted on a ~~said~~ high resolution stage.

5. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said adjustment means includes separate x pre-load means and y pre-load means and x adjustment screws and y adjustment screws operable while said substrate chuck is mounted on a said high resolution stage.

6. (Amended) A low-profile vernier x-y-theta substrate chuck
10 according to claim 5 ~~4~~, wherein said adjustment means includes ~~x and y pre-load means~~ and x, y, and theta adjustment screws operable while said substrate chuck is mounted on said high resolution stage.

7. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 6 ~~4~~, wherein said adjustment means includes ~~x and y pre-load means~~ and x, y, and theta adjustment screws operable while said substrate chuck is mounted on said high resolution stage, and includes a yaw shaft (8) and a central support spring (9) for said yaw vacuum diffuser
20 bracket 5, and also includes vacuum channel pattern means (24) juxtaposed with said yaw shaft (8).

8. (Amended) A low-profile vernier x-y-theta substrate chuck having a rigid high-flatness vacuum diffuser plate (7) with its top surface co-planar with the top surface plane of a yaw vacuum diffuser bracket (5) in a substrate support plane, said ~~x~~ yaw vacuum diffuser bracket (5) having a number of vacuum diffuser plate support islands (14), a peripheral vacuum diffuser plate locating relief (25) ~~support channel~~, and means to provide x, y and theta alignment adjustment while mounted on a flat surface of area significantly greater than its area, made by the following method:

10 Step 1. Dispensing a bead of epoxy cement (24) in the peripheral ~~channel~~ vacuum diffuser plate locating relief (25) and dispensing beads of epoxy cement on tops of the islands (14);

Step 2. Placing a vacuum diffuser plate (7) within said peripheral ~~channel~~ vacuum diffuser plate locating relief (25) of said ~~x-bracket~~ with sufficient force to deform said beads of epoxy cement so as to make a pre-assembly with the top surface of said vacuum diffuser plate (7) and top surface of said yaw vacuum diffuser bracket (5) plane non-co-planar;

20 Step 3. Flipping the pre-assembly over onto a high-flatness rigid surface plate;

Step 4. Shaking said pre-assembly to co-planar juxtaposition of the vacuum diffuser plate (7) and top surface of said yaw vacuum diffuser bracket (5); ~~plane of the x-bracket~~; and

Step 5. Letting the epoxy cement (24) cure.

9. (New) An alignable, low-profile substrate chuck for patterning an indeterminate number of substrate panels, one at a time, adjustable in x, y and theta while on the movable platform of a stage,

comprising:

an x-bracket (1);

an x, y – bracket (2) mounted movably to said x-bracket (1) and having a slideway (26);

10 a y, yaw bracket (3) mounted slidably in said slideway (26) of said x, y –bracket (2), having a central yaw shaft opening for a yaw shaft (8) and vacuum channel (27);

a yaw bracket (4) mounted in said slideway (26) and carrying a yaw shaft (8) with a vacuum channel (27);

a vacuum diffuser plate (7);

a yaw vacuum diffuser bracket (5) with a top surface forming an apron, configured with a peripheral vacuum diffuser plate locating relief (25) and a plurality of support islands (14) together providing positioning for said vacuum diffuser plate (7) with its top surface flush with such apron defining a substrate support plane; and

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x, y and theta adjustment means.